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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/781,283      | 02/13/2001  | Pei Reng Jeng        | MR1035-820          | 9464             |

4586 7590 07/24/2002

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ELLIOTT CITY, MD 21043

EXAMINER

ESTRADA, MICHELLE

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 07/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                              |                  |
|------------------------------|------------------------------|------------------|
| <b>Office Action Summary</b> | Application No.              | Applicant(s)     |
|                              | 09/781,283                   | JENG ET AL.      |
|                              | Examiner<br>Michelle Estrada | Art Unit<br>2823 |

-- The MAILING DATE of this communication appears in the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 13 May 2002.

2a) This action is FINAL.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-19 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_

4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_

5) Notice of Informal Patent Application (PTO-152)

6) Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Andideh and Ang et al.

Andideh discloses providing a semiconductor substrate already completing the basic process of forming devices 100 such as a field oxide 102, a source, a drain, and a gate thereon (Col. 1, lines 22-24 and Fig. 1d); wherein the gate comprises a tunneling oxide layer, a floating gate, a dielectric layer and a control gate; forming a dielectric layer 103 (BPSG or PSG) used as an inter-layer dielectric on said semiconductor substrate, lapping said dielectric layer by means of a chemical mechanical polishing; and forming an oxide layer 106.

Andideh does not disclose forming a cap layer of high refractive index on said lapped dielectric layer.

Ang et al. disclose semiconductor structure 10 that includes exposed semiconductor devices or interconnect lines 12 which can be comprised of aluminum; forming an ILD 16/18 and chemical-mechanical polishing 18 which can be comprised of FSG or a low K dielectric layer (Col. 3, lines 35-36); and forming a capping layer 20 that

may be comprised of silicon nitride, silicon oxynitride or silicon-rich oxide (SRO); wherein said cap layer is a dielectric layer having a refractive index not less than 1.6.

It would have been within the scope of one of ordinary skill in the art to combine the teachings of the references to obtain the capping layer of Ang et al. because the method of Andideh would be selected in accordance with the teachings of Ang et al. ad further provides the desirable material for the capping layer.

The examiner takes judicial notice that the use of polysilicon material in floating gates and control gates was known at the time of the applicant's invention. It would have been within the scope of one of ordinary skill in the art to use the known material for its known intended purpose to achieve the floating and control gates of the combination.

The examiner takes judicial notice that the use of PECVD silicon oxide layer and tetraethyl-orthosilicate layer to form an inter-metal dielectric was known at the time of the applicant's invention. It would have been within the scope of one of ordinary skill in the art to use the known layers for its known intended purpose to achieve the inter-metal dielectric layer of the combination.

### ***Response to Arguments***

Applicant's arguments filed 5/13/02 have been fully considered but they are not persuasive. Applicant argues that the refractive index of a cap layer made of silicon-rich oxide is around 1.5. This is found to be contradictory to applicant's disclosure on page 5, lines 3-5, where applicant discloses silicon-rich oxide as one of the possible materials

for the cap layer 114 having a refractive index not less than 1.6. Ang et al. discloses using specifically the same materials for cap layer 20 as that of the present invention as stated in the office action mailed 2/13/02, the same materials are treated in the same manner.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Estrada whose telephone number is 703-308-0729. The examiner can normally be reached on Monday through Friday.

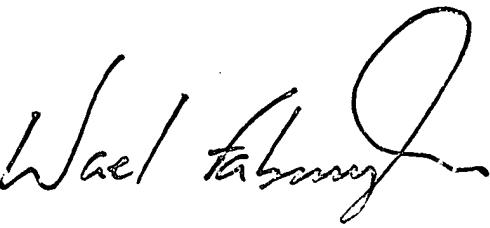
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 703-308-4918. The fax phone numbers for

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the organization where this application or proceeding is assigned are 703-308-7722  
(7724, 3431 and 3432) for regular communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

  
M. Estrada  
July 18, 2002

  
Wael Tabbagh  
SUPERVISORY PRIMARY EXAMINER  
TECHNOLOGY CENTER 2800